

Medical Science

25(115), September, 2021

To Cite:

Alhothali OS, Bahakim AK, Alharthi SM, Alsaede AK, Alharthi SM, Aljahdali IA, Shatla MM. Prevalence and associated factors of suicidal ideation and attempts among undergraduate medical students of Umm Al-Qura University, Saudi Arabia: A cross sectional study. Medical Science, 2021, 25(115), 2213-2221

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Peer-Review History

Received: 16 July 2021

Reviewed & Revised: 18/July/2021 to 22/August/2021

Accepted: 24 August 2021

Published: August 2021

Peer-review Method

External peer-review was done through double-blind method.

Prevalence and associated factors of suicidal ideation and attempts among undergraduate medical students of Umm Al-Qura University, Saudi Arabia: A cross sectional study

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ABSTRACT

Introduction: Suicide is the second major cause of mortality amongst young adults, and medical students are vulnerable to suicidal ideation due to overwhelming distress resulting from academic and non-academic issues. This study aimed to estimate the prevalence rates of suicide ideation, behavior, and to find out their potential association with different factors among undergraduate medical students of Umm Al-Qura University, Saudi Arabia. **Methods:** This cross-sectional study was conducted in April 2021 by posting an online survey on social media platforms (WhatsApp) to collect data on participants' socio-demographics, and a validated English version of the Columbia-suicide severity rating scale (C-SSRS) to assess suicidal ideation and behavior as well as the Copenhagen Burnout Inventory (CBI) scale to measure the level of burnout. **Results:** A total of 346 subjects responded to the questionnaire. Among study participants, suicide ideation and attempt was found to be 40.5% and 9.2%, respectively. Binary logistic regression revealed that students with a history of psychiatric disorders, high burnout, smokers, and those who had parental neglect were associated with higher risk of suicidal ideation ($p < 0.05$). The single greatest risk factor predisposing to suicidal ideation was smoking. This was followed by previous psychiatric disorders and parental neglect. **Conclusions:** High prevalence of suicide ideation and attempts was demonstrated among medical students. Mental health program should be provided to reduce suicidal tendencies among undergraduate medical students.

Keywords: Suicide Ideation, Burnout, Suicide Attempt.



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1. INTRODUCTION

Suicidal behavior includes suicidal ideation, suicide attempts, and completed suicide. It is a worldwide cause of morbidity and mortality. According to the World Health Organization (WHO), over 800,000 individuals die by suicide each year. Globally, it is considered as one of the leading cause of mortality amongst young adults. This behavior results from the compound interaction of psychosocial, cultural, and environmental factors (WHO, 2014). Numerous risk factors work cumulatively to increase a person's susceptibility to suicidal behavior. These include burnout, sleep problems, previous psychiatric illnesses, number of study years, substance abuse, low social support, financial difficulties, feeling neglected, and professional distress (Dyrbye et al., 2008; Dachew et al., 2016; Coentre et al., 2016; Coentre & Góis, 2018; Mahmoudi et al. 2020). Of these risk factors, being a medical student makes one particularly vulnerable to suicidal ideation due to the overwhelming distress resulting from academic and non-academic issues (Shanafelt et al., 2011; Schernhammer & Colditz, 2004). Several studies have demonstrated that medical students have a substantially lower mental quality of life versus age-matched individuals in the general population (Dyrbye et al., 2006). Suicidal ideation is an important predictor of suicidal planning and attempts. Such ideation is more common than suicidal attempts or completed suicide (Goyal et al., 2012).

The prevalence rates of suicidal ideation among medical students are variable as seen by the many studies conducted outside Saudi Arabia. In a systematic review and meta-analysis of 24 studies including 21002 medical students, the prevalence rates of suicidal ideation was 11.1% (Rotenstein et al., 2016). Another systematic review found that suicidal ideation prevalence amongst medical students varied between 1.8% to 53.6% in 13 countries (Coentre & Góis, 2018). A cross sectional analysis by Asfaw Henock et al., (2020) showed that the prevalence rates of suicidal ideation and behavior were 23.7% and 3.9%, respectively. There were statistical associations between suicidal behavior and cumulative grade point average, depression and a lack of social support. In 2017, a cross sectional study in China illustrated that suicidal ideation, planning, and attempts were 17.9%, 5.2%, and 4.3%, respectively (Sun et al., 2017).

Nevertheless, there is a lack of epidemiologically reliable data on suicidal ideation and behavior amongst Saudi medical students. Therefore, this study aimed to estimate the prevalence rates of suicide ideation, behavior, and to find out their potential association with different factors among undergraduate medical students of Umm Al-Qura University, Saudi Arabia.

2. METHODS

The participants were undergraduate medical students of Umm Al-Qura University, Saudi Arabia. A cross-sectional study was carried out in April 2021 by posting an online survey on social media platforms (WhatsApp) with a sample size of 346 participants. The average number of medical students of UQU during the academic year 2021 is 1250. With a confidence level of 95%, margin of error of 5%, and response distribution of 50%, the minimum recommended sample size for this study is 295 according to Sample Size Calculator software (Raosoft, Inc., Seattle, WA, USA). However, 346 participants responded to the questionnaire and were implied in the study which constitutes a confidence interval of 97%. The study sample was equally distributed among the five academic years. Convenience sampling was employed.

The inclusion criteria consisted of undergraduate medical students from 2nd to 6th year at Umm Al-Qura University, Makkah, Saudi Arabia; 31 uncompleted questionnaires were excluded. The questionnaire consisted of four parts. The first part recorded academic and demographic characteristics like gender, year of study, grade point average (GPA), living status, and academic performance. The second part comprised of a set of eight questions related to parental neglect, smoking, and difficulty making friends, chronic medical problems, and psychiatric disorder. All of these questions had a dichotomous (yes/no) response format. Five questions measured suicidal ideation over the last year and formed the third part of the questionnaire. A validated scale was used to assess suicidal ideation and behavior—this is the Columbia-suicide severity rating scale (C-SSRS; six-item tool). Answering “yes” to any of the six questions indicates the presence of suicidal ideation with or without suicidal behavior. Dr. Kelly Posner, the author of the C-SSRS, gave us the permission to use the scale in our study. The six questions asked were:

- "In the past 12 months: Have you wished you were dead or wished you could go to sleep and never wake up?"
- "In the past 12 months: Have you had any thoughts about killing yourself?"
- "In the past 12 months: Have you thought about how you would kill yourself?"
- "Did you think that this was something you might actually do?"
- "Was any part of your thinking about actually doing it?"
- "Did you do anything to try to kill yourself or make yourself not alive anymore?"

The fourth part of the questionnaire measured the level of burnout using the Copenhagen Burnout Inventory (CBI) scale. This scale is divided into personal (six items) and work-related (six items). In the work-related part, the word "work" was changed to

"study" in all items to make this part more responsive to students. The responses were assessed on a five-point Likert-type scale of "extremely low degree," to "extremely high degree," with scores ranging from 0 to 100, respectively. The burnout score was measured using the average score of each scale's items, the total score is the average of the two scales. High burnout was defined as a score of more than 50; low burnout was defined as a score of less than 50.

This cross-sectional study was carried out after obtaining ethical approval from the Medical Ethics Committee of Umm Al-Qura University, Faculty of Medicine, Saudi Arabia. Participation was voluntary. Consent was taken from the participants by marking yes to the first question "Do you agree to participate in this study?" after explanations of the objectives and methodology of the study. The participants were told that their information would be kept confidential and saved in a secure file.

Data analysis

The data obtained from the questionnaire were entered into SPSS version 20. The sociodemographic and academic characteristics of the participants were summarized using descriptive parameters. Tables and graph were used for descriptive purpose. Chi square analysis and multiple logistic regression analysis were calculated to measure the association of different factors with suicidal ideation. Odds ratios and their associated 95% confidence intervals (CIs) were used as measures of effect size. A p-value considered significant if it was less than 0.05.

3. RESULTS

Socio demographic and academic characteristics

A total of 346 medical students participated. Of the 346 participants, 175 were males (50.6%) and 171 were females (49.4%). Most of the students were single 333 (96.2%), and 327 (94.5%) live with their parents. Fifty-nine (17.1%) of the students were in the second year, 66 (19.1%) in the third year, 80 (23.1%) in the fourth year, 76 (22%) in the fifth year, and 65 (18.8%) in the sixth year. Around 233 (67.3%) participants had GPAs greater than 3.5 while 89 (25.7%) were between 3 and 3.5; the rest were between 2.5 and 3. Some respondents had thoughts about deferring their course and completing it the next year: yes (current) 26 (7.5%), yes (previous) 122 (35.3%), and no (never) 198 (57.2%). Regarding the curriculum, 63 subjects (18.2%) were completely satisfied, 238 (68.8%) were partially satisfied, and 45 (13%) were dissatisfied. The self-evaluation of college performance found that 37 (10.7%) excellent reviews, 178 (51.4%) good, 94 (27.2%) borderline, 26 (7.5%) bad, and 11 (3.2%) very bad. In addition, 117 (33.8%) performed poorly in exams, 225 (65%) felt overwhelmed, 88 (25.4%) had difficulties making friends, 80 (23.1%) felt rejected by their peers, 57 (16.5%) had parental neglect, 49 (14.2%) had a chronic medical disorder, 77 (22.3%) had a history of a psychiatric disorder, and 40 (11.6%) were smokers (Table 1).

Table 1 Socio-demographic and academic characteristics of the participants (N=346).

Variable		Frequency	Percent
Gender	Male	175	50.6
	Female	171	49.4
Marital status	Single	333	96.2
	Married/Engaged	13	3.8
Living Status	Lives alone	19	5.5
	Lives with parents	327	94.5
Academic year	2nd Year	59	17.1
	3rd Year	66	19.1
	4th Year	80	23.1
	5th Year	76	22.0
	6th Year	65	18.8
GPA	>3.5	233	67.3
	3.5-3	89	25.7
	3-2.5	24	6.9
Had a thoughts about deferring the course and completing it	Yes, Current	26	7.5

next year			
	Yes, Previous	122	35.3
	No, Never	198	57.2
Satisfaction with the curriculum/modules	Completely Satisfied	63	18.2
	Partially Satisfied	238	68.8
	Dissatisfied	45	13
Self-evaluation of college performance	Excellent	37	10.7
	Good	178	51.4
	Borderline	94	27.2
	Bad	26	7.5
	Very bad	11	3.2
Perform poorly in exams, yes		117	33.8
Feeling overwhelmed, yes		225	65
Difficulty of making friends, yes		88	25.4
Feeling of rejection by peers, yes		80	23.1
Parental Neglect, yes		57	16.5
History of chronic medical disorder, yes		49	14.2
History of psychiatric disorder, yes		77	22.3
Smoking status, yes		40	11.6

The prevalence of suicidal ideations and behaviors are shown in Figure 1. The wish to be dead was the most prevalent ideation (40.5%) followed by nonspecific active suicidal thoughts (25.1%); suicidal attempts were less frequent (9.2%). The bivariate analysis showed that there was a significant association between suicidal ideation and students' gender ($p<0.001$), 5th academic year ($p=0.012$), self-evaluation of college performance ($p<0.001$), poor exam performance ($p<0.001$), thoughts about deferring the course ($p<0.001$), satisfaction with the curriculum ($p<0.001$), feeling overwhelmed ($p<0.001$), difficulty of making friends ($p<0.001$), feeling rejected by peers ($p<0.001$), parental neglect ($p<0.001$), history of chronic medical disease ($p<0.001$), history of psychiatric disorder ($p<0.001$), high burnout score ($p<0.001$), and being a smoker ($p<0.001$). We also found a significant relationship between suicidal attempt and students' gender ($p=0.022$), self-evaluation of college performance ($p=0.025$), thoughts about deferring ($p=0.005$), satisfaction with the curriculum ($p=0.016$), feeling overwhelmed ($p=0.016$), difficulty of making friends ($p<0.001$), history of chronic medical disease ($p<0.001$), history of psychiatric disorder ($p<0.001$), and average of the total score of burnout ($p<0.001$) (Table 2).

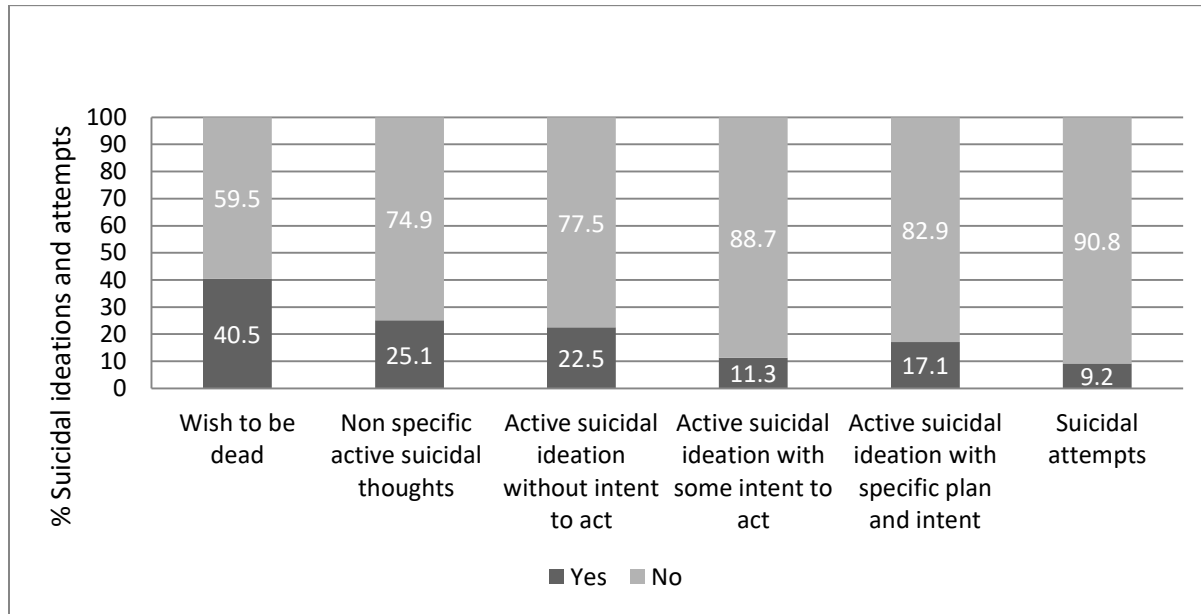


Figure 1 Suicidal ideations and attempts according to the C-SSRS amongst medical students of Umm Al-QuraUniversity during the past 12 months. Participants could have more than one ideation with or without suicidal attempts.

There was no significant relationship between suicidal ideation and student's GPA ($p=0.116$). Moreover, there was no significant differences between suicidal attempt and students' academic year ($p=0.111$), GPA ($p=0.118$), poor exam performance ($p=0.644$), feeling rejected by peers ($p=0.481$), parental neglect ($p=0.387$), and smoking ($p=0.182$); none were associated with suicide attempts (Table 2).

Table 2 Suicidal ideation and attempt in relation to student characteristics.

Variables		Suicidal Ideation			Suicidal Attempt		
		Yes, n (%)	No, n (%)	p value	Yes, n (%)	No, n (%)	p value
Gender	Male	48(27.4)	127(72.6)	.000	10(5.7)	165(94.4)	.022
	Female	92(53.8)	79(46.2)		22(12.9)	149(87.1)	
Academic year	2 nd year	29(20.7)	30(14.6)	.012	10(16.9)	49(83.1)	.111
	3 rd year	34(24.3)	32(15.5)		5(7.6)	61(92.4)	
	4 th year	33(23.6)	47(22.8)		7(8.8)	73(91.3)	
	5 th year	19(13.6)	57(27.7)		8(10.5)	68(89.5)	
	6 th year	25(17.9)	40(19.4)		2(3.1)	63(96.9)	
GPA	>3.5	103(44.2)	130(55.8)	.116	24(10.3)	209(89.7)	.118
	3.5-3	30(33.7)	59(66.3)		4(4.5)	85(95.5)	
	3-2.5	7(29.2)	17(70.8)		4(16.7)	20(83.3)	
What is your self-evaluation of college performance?	Excellent	15(10.7)	22(10.7)	.000	4(10.8)	33(89.2)	.025
	Good	55(39.3)	123(59.7)		9(5.1)	169(94.9)	
	Borderline	43(30.7)	51(24.8)		12(12.8)	82(87.2)	
	Bad	21(15)	5(2.4)		6(23.1)	20(76.9)	
	Very bad	6(4.3)	5(2.4)		1(9.1)	10(90.9)	
Do you perform poorly in exams?	Yes	63(45)	54(26.2)	.000	12(10.3)	105(89.7)	.644
	No	77(55)	152(73.8)		20(8.7)	209(91.3)	
Have you had thoughts about deferring your course	Yes, Current	23(16.4)	3(1.5)	.000	7(26.9)	19(73.1)	.005
	No						

and completing it next year?	Yes, Previous	57(40.7)	65(31.6)		9(7.4)	113(92.6)	
	No, Never	60(42.9)	138(67)		16(8.1)	182(91.9)	
What is your satisfaction with the curriculum/modules?	Completely Satisfied	14(10) .000	49(23.8)		7(11.1)	56(88.9)	.016
	Partially Satisfied	98(70)	140(68)		16(6.7)	222(93.3)	
	Dissatisfied	28(20)	17(8.3)		9(20)	36(80)	
Do you feel overwhelmed?	Yes	124(88.6)	101(49)	.000	27(12)	198(88)	.016
	No	16(11.4)	105(51)		5(4.1)	116(95.5)	
Do you have a difficulty of making friends?	Yes	50(35.7)	38(18.4)	.000	18(20.5)	70(79.5)	.000
	No	90(64.3)	168(81.6)		14(5.4)	244(94.6)	
Do you feel rejected by your peers?	Yes	46(32.9)	34(16.5)	.000	9(11.3)	71(88.8)	.481
	No	94(67.1)	172(83.5)		23(8.6)	243(91.4)	
Do you have a parental neglect?	Yes	42(30)	15(7.3)	.000	7(12.3)	50(87.7)	.387
	No	98(70)	191(92.7)		25(8.7)	264(91.3)	
Do you have a history of chronic medical disease?	Yes	33(23.6)	16(7.8)	.000	14(28.6)	35(71.4)	.000
	No	107(76.4)	190(92.2)		18(6.1)	279(93.9)	
Do you have a history of psychiatric disorder?	Yes	56(40)	21(10.2)	.000	15(19.5)	62(80.5)	.000
	No	84(60)	185(89.8)		17(6.3)	252(93.7)	
Level of burnout*	High burnout	140 mean (71.25)		.000	32 mean (74)		.000
	Low burnout		206 mean (49.17)			314 mean (56.5)	
Are you smoker?	Yes	27(19.3)	13(6.3)	.000	6(15)	34(85)	.182
	No	13(80.7)	193(93.7)		26(8.5)	280(91.5)	

*Using T-Test

Table 3 Logistic regression for suicidal ideation

Variable		OR	95% C.I.	p-value
	Gender	0.615	0.310 - 1.220	0.164
	Marital status	0.311	0.057 - 1.696	0.177
	Living status	0.396	0.068 - 2.313	0.304
	Academic year			0.043
	Academic year (2 nd Year)	1.989	0.628 - 6.298	0.242
	Academic year (3 rd Year)	1.227	0.411 - 3.669	0.714
	Academic year (4 th Year)	1.180	0.415 - 3.356	0.756
	Academic year (5 th Year)	4.420	1.524 - 12.822	0.006

GPA			0.208
GPA (>3.5)	0.309	0.079 - 1.210	0.092
GPA (3.5 – 3)	0.320	0.083 - 1.228	0.097
Thoughts about deferring your course	2.233	1.248 - 3.996	0.007
Satisfaction with curriculum	1.325	0.654 - 2.685	0.435
Feel overwhelmed	2.507	1.047 - 6.000	0.039
Difficulty making friends	1.170	0.516 - 2.656	0.707
Rejection by peers	0.433	0.194 - 0.965	0.041
Parental neglect	3.708	1.501 - 9.164	0.005
Self-evaluation of performance	1.119	0.739 - 1.693	0.596
Poor performance in exams	0.691	0.319 - 1.499	0.350
History of chronic medical disease	1.474	0.573 - 3.796	0.421
History of psychiatric disorder	4.579	2.119 - 9.893	0.000
Burnout score	2.942	1.920 - 4.964	0.006
Smoker	5.502	1.895 - 15.975	0.002

There was an increased risk for suicidal ideation among fifth year medical students, those with thoughts about deferring the course, feeling overwhelmed, parental neglect, students with history of psychiatric disorders, high burnout score, and smokers ($p < 0.05$). Table 3 shows the binary logistic regression for suicidal ideation. Smokers, students with history of psychiatric disorders, high burnout score, fifth year medical students, and those with parental neglect had a significantly higher risk for suicide ideation ($p < 0.05$). Smoking students had a higher risk for suicidal ideation [OR = 5.502, 95% CI (1.895 – 15.975); $p = 0.002$] followed by a positive history of psychiatric disorders [OR = 4.579, 95% CI (2.119 – 9.893); $p < 0.001$]. The Chi-square test did not show any significant differences between gender, GPA, and suicidal ideation.

4. DISCUSSION

A cross-sectional survey was carried out in April 2021 and distributed via a social media platform. This study involved undergraduate medical students of the faculty of medicine from second to sixth year students. A high response rate was achieved, and standardized and validated instruments were used to estimate the prevalence rates of suicide ideation, behavior, and to find out their potential association with different factors.

In the current study, the prevalence of suicidal ideation amongst medical students was 40.5%. Our result is consistent with those of previous studies conducted among medical students in Australia, Pakistan, and South Africa. The prevalence was estimated at 37.8%, 35.6%, and 32.3%, respectively (Eskin et al., 2011; Osama et al., 2014; Van Niekerk et al., 2012). Nevertheless, it is higher than those previously reported from studies performed in Ethiopia (14%) (Desalegn et al., 2020), Egypt (12.75%) (Ahmed et al., 2016), and China (7.5%) (Sobowale et al., 2014). This discrepancy could be attributed to the differences in study design, sample size, instruments used, and the socio-cultural differences between Saudi Arabia and other countries. The lifetime rate of suicide attempt in the present study was 9.2%. This finding is similar to studies conducted in Ethiopia (7.4%) (Desalegn et al., 2020), South African (6.9%) (Van Niekerk et al., 2012), and Turkey (6.4%) (Eskin et al., 2011).

Surprisingly, the lifetime rate of suicidal ideation was significantly higher in the fifth year relative to other years. This finding agrees only with Zheng and Wang, (2014) who showed that the fourth and fifth-year student were more prone to suicidal ideation. This rather contradictory result of all previous studies may be due to varying academic stress, different stages of training, and a heavy course load. In our study, the thoughts about deferring the course independently predicted the suicidal ideation (OR, 2.23). These thoughts may create great distress and have been strongly associated with suicidal ideation as reported by Dyrbye et al., (2011). A significant association was found between feeling overwhelmed and suicidal ideation as seen previously (Goyal et al., 2012).

Our research demonstrated that those individuals who have been neglected by their parents are more likely to have suicide thoughts. It agrees with the finding of previous study (Osama et al., 2014). Children who are neglected by their parents grow up without the inner stability and security that everyone needs to cope with difficult times. We found that Students with a positive history of psychiatric problems have a higher risk of suicide ideation (OR, 4.58). This finding is congruent with previous study in

Pakistan (Osama et al., 2014). Indeed, more than 90% of people who commit suicide have a history of mental disorder (Arsenault-Lapierre et al., 2004). Therefore, medical student with psychiatric disorder should be identified, counseled, and treated accordingly. Burnout seems to be more common form of distress among medical students (Dyrbye et al., 2006).

A study in America found that burnout increases the risk of suicidal thoughts by two- to three-fold (Dyrbye et al., 2008). This is consistent with our findings. Suicidal ideation was shown to be significantly reduced when individuals recovered from burnout (Dyrbye et al., 2008). Thus, identifying and treating burnout may reduce the risk of suicide. Students who are smokers are at a five-fold higher risk for suicidal ideation (OR, 5.50). This result is similar to a survey conducted in Pakistan, which showed a three-fold increased risk (Osama et al., 2014). Identifying smoking as a predisposing factor for suicidal ideation provides the opportunity for interventions and counseling.

Limitations of the study

This study has several limitations. First, the study was cross sectional. Hence, we could only report on associations rather than causal relationships. Second, the study was conducted during the exam period, which is stressful for medical students. Third, only one medical school was surveyed, and the results cannot be generalized. Nevertheless, the large sample size employed in the study and high response rate support the results validity of suicidal ideation and its relationship to other factors.

5. CONCLUSIONS AND RECOMMENDATIONS

The prevalence rates of suicidal ideation amongst undergraduate medical students were 40.5%. The predictors were parental neglect, students with history of psychiatric disorders, high burnout score, and smoking. This finding showed that suicidal ideation and behavior in medical students remains a remarkable concern. One of the recommendations based on this study is that universities should collaborate with the Ministry of Health to organize several activities to ameliorate psychological health for students. Medical care programs should be designed to support students and promote student mental health. Our study suggests the need for an intervention to address the factors influencing suicidal ideation and attempts such as educating and helping students to overcome burnout. Those with history of psychiatric disorders should be encouraged to meet with a psychiatrist to manage their condition.

Acknowledgement

We thank the participants who were all contributed samples to the study.

Author's contributions

All the authors contributed in the selection of the idea, proposal writing, data collection, data entry and analysis, results and discussion writing and final revision of the article.

Ethical approval

The study was approved by the Medical Ethics Committee of Umm Al-Qura University (ethical approval code IGWM310321).

Conflicts of interest

The authors declare that they have no conflict of interest.

Funding

This study has not received any external funding.

Data and materials availability

All data associated with this study are present in the paper.

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